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IDENTIFIERS \*Alberta

## ABSTRACT

This document contains curriculum specifications for grade 9. Objectives are grouped under seven broad topic areas. For each objective and each topic area a percent of emphasis is given. The broad topic areas and percent emphasis for each of those areas are: (1) number systems, 22 percent; (2) ratios and proportions, 10 percent; (3) measurement, 6 percent; (4) geometry, 22 percent; (5) graphing, 5 percent; and (6) algebra, 35 percent. The algebra topic includes 22 specific objectives, including the solution of first degree equations, the use of formulae to solve problems, and the finding of products and factors. (PK)

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# GRADE 9 MATHEMATICS CURRICULUM SPECIFICATIONS ( Program of Studies, 1978 )

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**Alberta**  
EDUCATION  
May, 1987

SE 050 086

## GRADE 9 MATHEMATICS CURRICULUM SPECIFICATIONS

The Mathematics Curriculum specifications for Grade 9 were prepared in July 1981 by a committee of classroom teachers, consultants, and Alberta Education personnel under the direction of the Curriculum Branch. Alberta Education acknowledges with appreciation the contributions of the following members of the Grade 9 Mathematics Committee:

B. Stonell, Alberta Education, CHAIRMAN  
G. Popowich, Alberta Education  
W. Lencucha, Alberta Education  
M. Lastiwka, Edmonton Public School Board  
D. Kopan, Calgary Board of Education  
M. Russell, Sturgeon School Division  
H. Ward, Red Deer School District  
R. Cammaert, Taber School Division

The following considerations determined the final curriculum specifications for Grade 9.

1. The specifications were based on the *Program of Studies for Junior High Schools, 1978* (amended 1981).
2. Content objectives were used to establish the specifications. Attitudes, interests, and self-concept goals were carefully considered but not included at this time.

# CONTENT OBJECTIVES

|                                                                                                     | Per Cent Emphases* |
|-----------------------------------------------------------------------------------------------------|--------------------|
| Number Systems                                                                                      | 22                 |
| A. Whole Numbers                                                                                    |                    |
| - Writes the values for powers (whole number exponents).                                            | 1                  |
| - Understands and uses the following properties:                                                    | 3                  |
| a) $(a^x)^y = a^{xy}$                                                                               |                    |
| b) $a^{-x} = \frac{1}{a^x}$                                                                         |                    |
| c) $a^0 = 1, a \neq 0$                                                                              |                    |
| - Maintains previously developed skills in problem solving.                                         | 1                  |
| - Expresses a number as a product of factors (including prime factorization).                       | 1                  |
| B. Integers                                                                                         |                    |
| - Maintains previously developed skills.                                                            | 2                  |
| - Simplifies expressions involving the order of operations (four arithmetic operations and powers). | 1                  |
| C. Rationals                                                                                        |                    |
| - Maintains previously developed skills.                                                            | -                  |
| - Writes any number in scientific notation and vice versa.                                          | 1                  |
| - Recognizes a need for negative rationals.                                                         | -                  |
| - Writes positive or negative rationals in the lowest terms or higher terms.                        | -                  |
| - Adds, subtracts, multiplies, and divides positive or negative rational numbers.                   | 3                  |
| - Changes positive or negative rationals in the form $a/b$ , $b \neq 0$ , to decimals.              | 1                  |

\*Where dashes (-) appear in this column, the objective is to receive minor emphasis.

# CONTENT OBJECTIVES

|                                                                                                                                                                                                                                                                                                                                                                                                                                | Per Cent Emphases                            |
|--------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------|----------------------------------------------|
| <ul style="list-style-type: none"> <li>- Changes rational numbers in decimal form to the form <math>a/b</math>.</li> <li>- Solves problems involving positive and/or negative rationals (emphasis on decimals).</li> <li>- Estimates products and quotients to determine if an answer is reasonable.</li> <li>- Estimates square roots of numbers.</li> <li>- Uses tables to determine the square root of a number.</li> </ul> | <p>1</p> <p>4</p> <p>2</p> <p>1</p> <p>-</p> |
| Ratios and Proportions                                                                                                                                                                                                                                                                                                                                                                                                         | 10                                           |
| <ul style="list-style-type: none"> <li>- Maintains previously developed skills.</li> <li>- Uses ratios to solve problems involving:                             <ul style="list-style-type: none"> <li>a) percentages</li> <li>b) distance, speed, and time</li> <li>c) profit, interest, commission, tax, discount, premiums.</li> </ul> </li> <li>- Uses ratios to construct scale drawings.</li> </ul>                      | <p>3</p> <p>5</p> <p>2</p>                   |
| Measurement                                                                                                                                                                                                                                                                                                                                                                                                                    | 6                                            |
| <ul style="list-style-type: none"> <li>- Maintains previously developed skills.</li> <li>- Calculates surface areas (SI units) of prisms and cylinders using formulas.</li> <li>- Calculates the area of regular polygons.</li> </ul>                                                                                                                                                                                          | <p>4</p> <p>-</p> <p>2</p>                   |
| Geometry                                                                                                                                                                                                                                                                                                                                                                                                                       | 22                                           |
| <ul style="list-style-type: none"> <li>- Maintains previously developed skills.</li> <li>- Demonstrates knowledge of the Theorem of Pythagoras through an ability to solve problems.</li> <li>- With compass and straight-edge, constructs triangles congruent to given triangles, using SSS, SAS, and ASA.</li> </ul>                                                                                                         | <p>3</p> <p>4</p> <p>1</p>                   |

# CONTENT OBJECTIVES

|                                                                                                                                            | Per Cent Emphases |
|--------------------------------------------------------------------------------------------------------------------------------------------|-------------------|
| - Constructs regular polygons.                                                                                                             | 1                 |
| - Uses such terms as <i>edges, faces, lateral face, base, height, and slant height</i> in examining prisms, pyramids, and other polyhedra. | 1                 |
| - Classifies right prisms and right pyramids, given models of various types.                                                               | 2                 |
| - Constructs models of right prisms, right pyramids, or regular polyhedra as specified by the teacher.                                     | 1                 |
| - With assistance, develops formulas to measure volume and surface area of right prisms and cylinders.                                     | 3                 |
| - Given word problems or diagrams and formulas, solves volume and surface area problems.                                                   | 6                 |
| Graphing                                                                                                                                   | 5                 |
| - Makes graphs from mathematical data and recognizes the dependent variable and the relation constant. (Limit to linear relations.)        | 4                 |
| - Pictures square roots of numbers graphically and reads approximate roots of non-perfect squares from the graph.                          | 1                 |
| Algebra                                                                                                                                    | 35                |
| - Solves any first-degree equation in one variable with rational coefficients.                                                             | 3                 |
| - Writes word problems for given mathematical statements.                                                                                  | -                 |
| - Solves a variety of problems by writing an equation in one variable and solving same.                                                    | 2                 |
| - Knows that letters represent variables.                                                                                                  | -                 |
| - Knows that formulas represent rules or definitions that express a relation between variables in mathematics and/or science.              | 1                 |
| - Interprets mathematical data and can express it as a relationship. (Limit to linear relations using a non-formal approach.)              | 2                 |

# CONTENT OBJECTIVES

|                                                                                                                | Per Cent Emphases |
|----------------------------------------------------------------------------------------------------------------|-------------------|
| - Applies mathematical principles of variation and formulas to real situations.                                | 2                 |
| - Predicts the effect of altering specific elements of a formula.                                              | 1                 |
| - Solves problems that require the use of a formula.                                                           | 4                 |
| - Identifies specific algebraic terminology: <i>constants, variables, terms, and factors</i> in an expression. | 1                 |
| - Evaluates expressions by performing the operations in correct order.                                         | 1                 |
| - Classifies polynomials as monomials, binomials, or trinomials.                                               | 1                 |
| - States the degree of a polynomial and writes the polynomial in standard form.                                | 1                 |
| - Translates English expressions into algebraic expressions.                                                   | 1                 |
| - Identifies the numerical coefficient of a monomial.                                                          | 1                 |
| - Identifies "like" and "unlike" terms and is able to combine like terms.                                      | 1                 |
| - Finds the sum and difference of polynomials by reordering the elements.                                      | 2                 |
| - Finds the products and quotients of monomials.                                                               | 2                 |
| - Finds the product of a monomial and a polynomial.                                                            | 1                 |
| - Factors a polynomial by taking out the greatest common factor.                                               | 2                 |
| - Finds the product of binomials.                                                                              | 3                 |
| - Factors trinomials $ax^2 + bx + c$ , where $a = 1$ .                                                         | 3                 |
| TOTAL                                                                                                          | 100               |